USER'S MANUAL

Heat (Energy / Heat and Energy) Recovery Air-Handling Unit

VUT2 250 P EC
VUE2 250 P EC
VUTE2 250 P EC

CONTENTS

Safety requirements	3
Introduction	5
Use	5
Delivery set	5
Designation key	6
Main technical data	6
Unit design and operating logic	8
Mounting and set-up	9
Condensate drainage	9
Connection to power mains	10
Unit control	11
Technical Maintenance	15
Fault handling	17
Storage and transportation rules	18
Manufacturer's warranty	18
Acceptance certificate	20
Seller information	20
Connection certificate	20
Warranty card	21

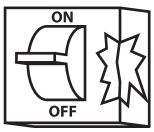
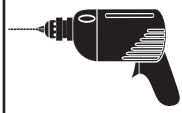
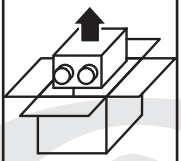
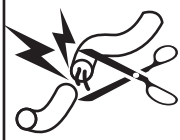
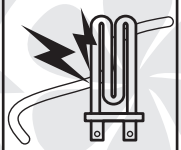
SAFETY REQUIREMENTS

- Read the user's manual carefully prior to installing and operating the heat (energy / heat and energy) recovery air-handling unit (hereinafter «Unit»).
- Fulfil the operation manual requirements as well as the provisions of all the applicable local and national construction, electrical and technical codes and standards.
- The warnings contained in the user's manual must be considered most seriously since they contain vital personal safety information.
- Failure to follow the safety regulations may result in an injury or unit damage.
- Read the manual carefully and keep it as long as you use the unit.
- While transferring the unit control the user's manual must be turned over to the receiving operator.

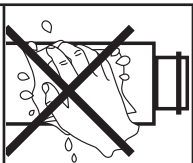
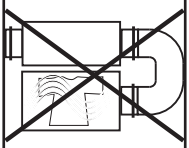
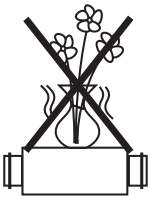
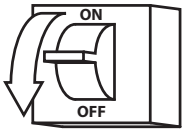
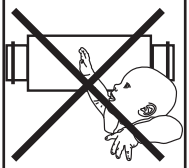
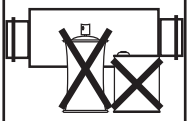
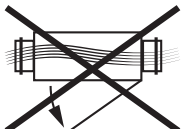
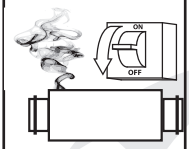
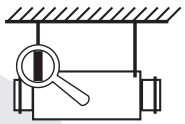
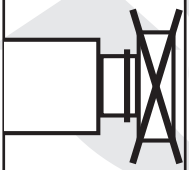
The symbols used in the present user's manual have the following meaning:

	WARNING!
	DO NOT!

UNIT MOUNTING SAFETY PRECAUTIONS

	The unit must be disconnected from the power mains prior to installation or repair.		THE UNIT MUST BE GROUNDED!
	The unit must not be operated outside the temperature range stated in the user's manual and in aggressive or explosive environments.		Do not use damaged equipment or conductors to connect the unit to the power mains.
	While installing the unit follow the safety regulations specific to the use of electric tools.		Unpack the unit with care.
	Do not change the power cable length at your own discretion. Do not bend the power cable. Avoid damaging the power cable.		Do not position any heating devices or other equipment in close proximity to the unit power cable.

SAFETY PRECAUTIONS TO BE FOLLOWED WHILE OPERATING THE UNIT.

	Do not touch the unit controls with wet hands. Do not carry out the unit maintenance with wet hands.		Do not wash the unit with water. Avoid penetration of water onto the electric parts of the unit.
	Use the unit only as originally intended. Do not connect any drying machines or other similar equipment to the unit and the ventilation circuit.		Do not put any water containers (e.g. vases etc.) on top of the unit.
	Do not sit on the unit or put any foreign objects on top of it.		Disconnect the unit from the power mains prior to any technical maintenance.
	Do not let children operate the unit.		Avoid damaging the power cable while operating the unit. Do not put any foreign objects on top of the power cable.
	Do not store any flammable gases or highly flammable substances in close proximity to the unit.		Do not open the unit during operation.
	Should the unit generate any unusual sounds, smell of smoke disconnect it from the power mains and contact the service centre.		In case of prolonged operation check the unit from time to time for any looseness which may develop in the fasteners.
	Do not shut off the air duct during the unit operation.		Do not direct the air stream produced by the unit onto any combustion appliances or burning candles.

INTRODUCTION

The present user's manual consisting of the technical details, operating instructions and technical specification applies to the installation and mounting the VU__2 250 P EC heat (energy / heat and energy) recovery air-handling unit (hereinafter «Unit»).

USE

Due to the ability to reduce heat/energy losses by means of recycling heat (energy / heat and energy) recovery air-handling units have become an important element of energy-efficient spaces. Being a component unit, the air-handling unit may not be commissioned for standalone operation.

The unit is designed to ensure continuous mechanical air exchange in houses, offices, hotels, cafes, conference halls and other utility and public spaces as well as to recover the heat energy contained in the air extracted from the premises to warm up the filtered stream of supply air.

The unit is designed for extended periods of continuous operation without disconnection from the power mains.

The transported air must not contain flammable or explosive mixtures, chemically active vapours, coarse dust, soot, fats or environments favourable for the formation of hazardous substances (toxic substances, dust, pathogenic germs), sticky substances and fibrous materials.

THE UNIT IS NOT INTENDED FOR OPERATION BY CHILDREN OR PERSONS WITH REDUCED PHYSICAL, MENTAL OR SENSORY CAPACITIES, OR LACKING THE APPROPRIATE TRAINING.

THE UNIT MUST BE HANDLED ONLY BY PROPERLY QUALIFIED PERSONNEL AFTER THE APPROPRIATE BRIEFING.

THE CHOICE OF UNIT INSTALLATION LOCATION MUST PREVENT UNAUTHORIZED ACCESS BY UNATTENDED CHILDREN.

DELIVERY SET

- Unit - 1 item.;
- User's manual - 1 item.;
- Packing box - 1 item.;
- Control panel - 1 item.;

DESIGNATION KEY

VUT 2 250 P EC

Motor Type
Electronically commutated (EC)

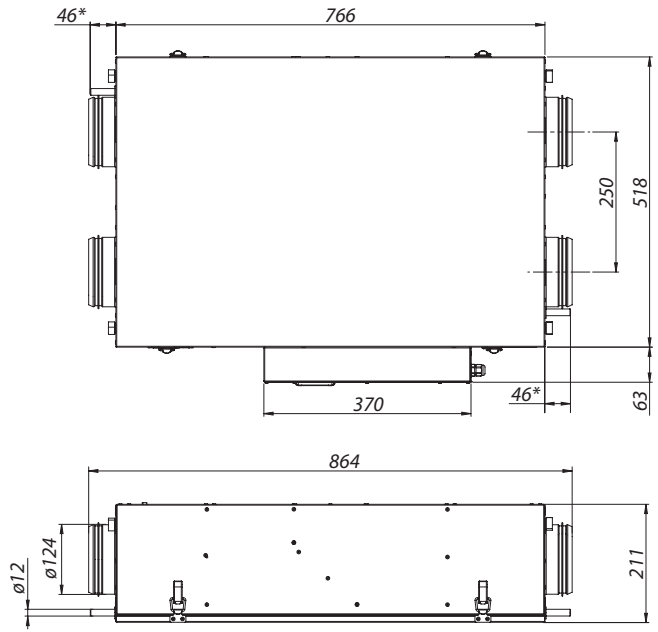
Design features
P - suspended mounting

Air capacity, m^3/h

Number of heat exchangers, pcs

Unit Type
VUT - Heat Recovery Ventilation
VUE - Energy Recovery Ventilation;
VUTE - Energy and Heat Recovery Ventilation.

MAIN TECHNICAL DATA



** - Only for VUT2 250 P EC and VUTE2 250 P EC units.*

Fig. 1. Outside and connecting dimensions of the unit

The air-handling units are intended for operation in closed spaces under ambient air temperatures from +1 ºC to +60 ºC and relative humidity up to 80%.

Hazardous parts access and water ingress protection rating:

- IP 44 for the unit motors;
- IP 22 for the assembled unit connected to the air ducts.

The unit series designations, the main outside and connecting dimensions of the unit as well as its appearance and technical parameters are given in Figure 1 and in Table 1.

The unit design is regularly improved, so some models can slightly differ from those ones described in this manual.

Table 1 . Unit Technical Parameters

Model	VUT2 250 P EC VUE2 250 P EC VUTE2 250 P EC
Unit voltage [V /50-60 Hz]	1 ~ 230
Maximum fan power, [W]	125
Fan current, [A]	0,87
Max. air capacity [m^3/h]	257
RPM	2930
Sound pressure level at 3 m distance [dB(A)]	39
Max. transported air temperature [°C]	from -25 up to +60
Casing material	aluzinc
Insulation	polypropylene foam, 10 mm
Filter: air exhaust/air supply	G4 bag filter (SFK VUT2 200-250 P/P EC G4)
Connected air duct diameter [mm]	Ø 125
Heat recovery efficiency [%]	up to 89
Heat exchanger type	cross flow, 2 items

UNIT DESIGN AND OPERATING LOGIC

The unit operating logic is illustrated in Fig. 2. The warm stale air from indoors is supplied into the unit where it undergoes filtration. The filtered air is directed into the heat exchangers and extracted outdoors via the air duct system by the extract fan. The fresh cold air from outdoors is supplied into the unit where it undergoes filtration. The filtered air is directed into the heat exchangers and supplied into the premises by the supply fan. The heat exchangers ensure the heat energy exchange between the warm stale air from indoors and the cold fresh air from outdoors without air stream intermixing. Such design reduces heat energy losses and helps to minimize heating expenses in the cold season.

The unit design and operation logic are given in Fig. 2. The basic unit equipment includes:

1. Extract motor-impeller block.
2. Supply motor-impeller block.
3. Cross-flow plate heat exchanger.
4. G4 extract filter.
5. G4 supply filter.
6. Condensate drain pan:
   - for VUT2 250 P EC unit - 2 pieces
   - for VUTE2 250 P EC unit - 1 piece
   - VUE2 250 P EC units have no drain pan.
7. Condensate drain pipe:
   - for VUT2 250 P EC unit - 2 pieces
   - for VUTE2 250 P EC unit - 1 piece
   - VUE2 250 P EC units have no drain pipe.
8. Control unit.

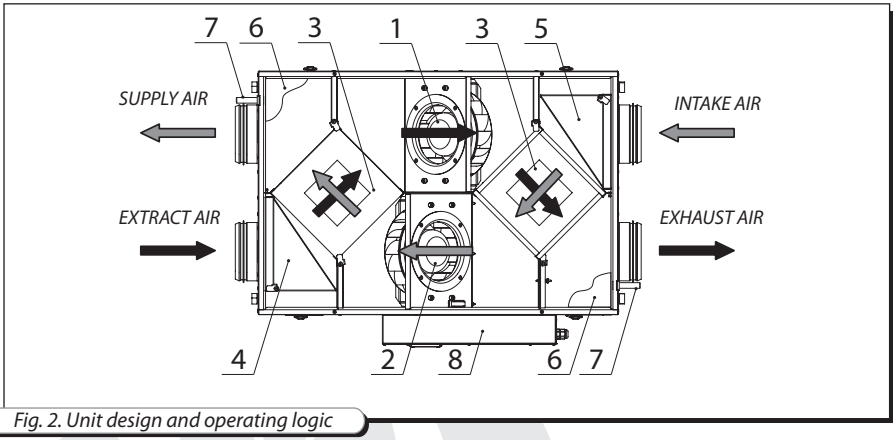


Fig. 2. Unit design and operating logic

Mounting and set-up

Make sure that the installation location provides for sufficient space as required for the unit maintenance.

The units are suspended to the ceiling by means of belts rigidly fastened to a horizontal surface (Fig. 3) or threaded rods screwed into dowels which are buried into the ceiling. Prior to the installation check the unit casing for any left-over foreign objects such as plastic film or paper.

For best operation efficiency the unit should be preceded and followed by straight duct sections at least 1 m in length.

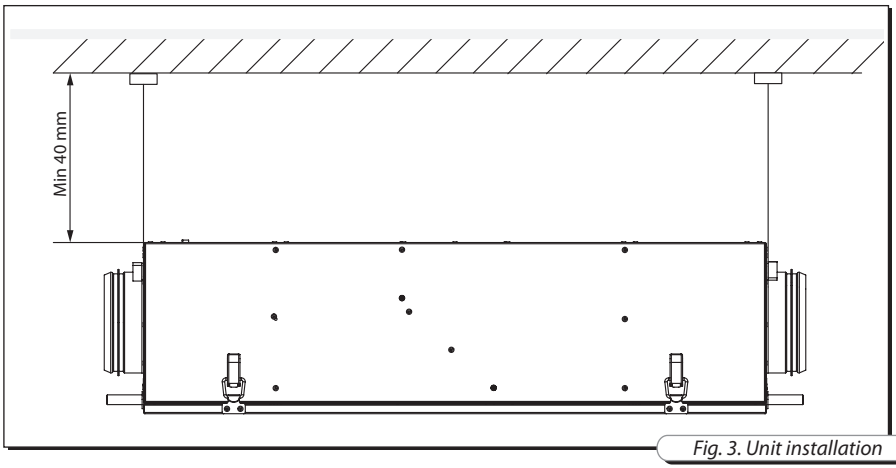


Fig. 3. Unit installation

Condensate drainage

The condensate drain pan located in the heat exchanger section is equipped with condensate drain pipes which lead the water away from the unit.

Connect the drain pipe (1), the U-trap (3) (not included in the standard delivery set) and the sewerage system (5) with metal, plastic or rubber pipes (2) and (4). The pipes must be installed at the minimum gradient of 3°. Prior to connecting the unit to the power mains prime the system with water! The U-trap must be filled with water at all times! Check for any obstructions to the free flow of water into the sewerage system to prevent condensate accumulation inside the unit during the heat exchanger operation which, in turn, may cause equipment failure and water ingress into the premises.

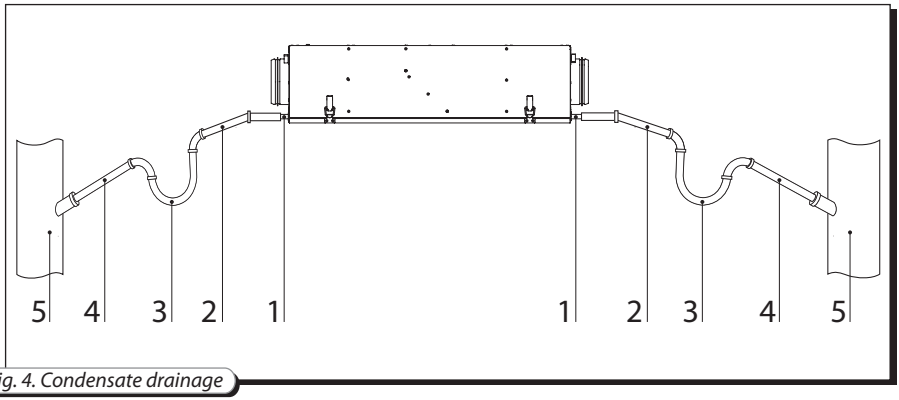


Fig. 4. Condensate drainage

A condensate drainage system is used in premises with above-zero temperatures. To enable operation at subzero temperatures the condensate drainage system must be equipped with heat insulation and pre-heating facilities.

Connection to power mains

Disconnect the unit from the power supply prior to any operations on the unit! The unit must be plugged into a properly installed power socket with an earthed terminal. The rated electrical parameters of the unit are stated on the rating plate. Any tampering with the internal connections is prohibited and will void the warranty.

The units are intended for connection to 230 V / 50 (60) Hz single-phase alternating current mains. The power mains connection is via a Euro plug cable pre-wired at the factory.

Connect the unit to power mains through the external automatic circuit breaker with magnetic trip integrated into the fixed wiring system with the rated current not below the rated current consumption (refer to Table 1).

UNIT CONTROL

The unit control panel is designed to run two alternative software versions:

- **DUO/6M901580B (installed by default);**
- **DUO/6T901580.**

The software version installed on a specific unit is specified on the label attached to the rear side of the control panel.

The unit is operated via the control panel (Fig. 5).

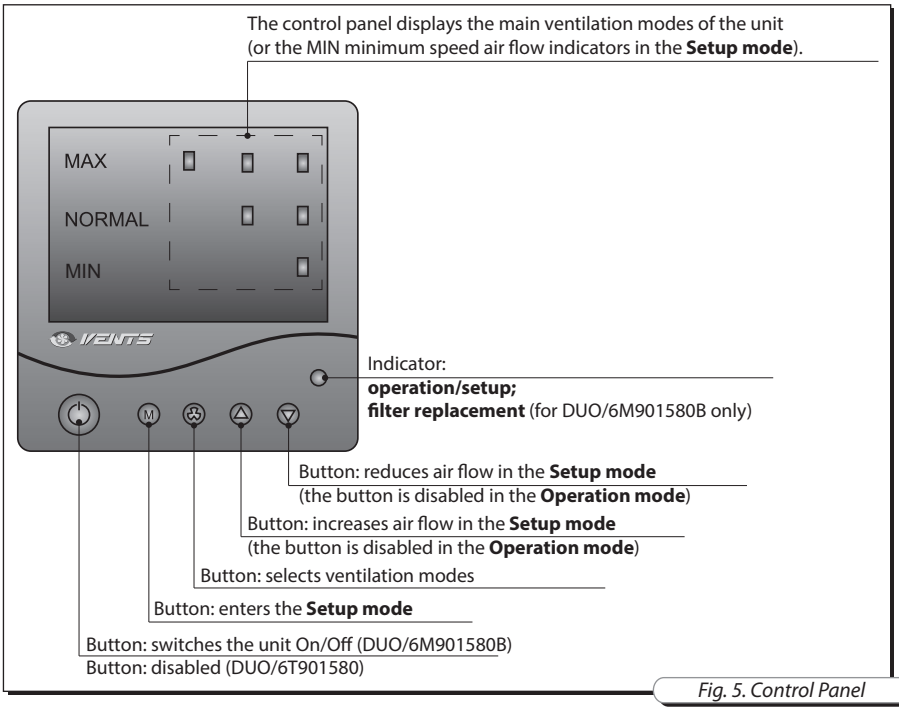


Fig. 5. Control Panel

1. Ventilation mode control.

The air-handling unit has three ventilation modes:

- MIN - the basic ventilation mode. The air flow rate for this mode is selected in the Setup mode according to Table 3 (see p.2 Setup Mode);
- NORMAL - the air flow rate in this mode is 80 m^3/h higher than in the MIN mode.

The DUO/6T901580 software automatically reverts the unit to the MIN mode 30 minutes after enabling the NORMAL mode;

- MAX - delivers the maximum air flow rate according to the unit specifications.

The ventilation modes indication is explained in Table 2.

To switch between ventilation modes use the button.

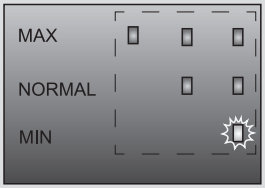
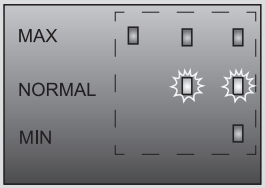
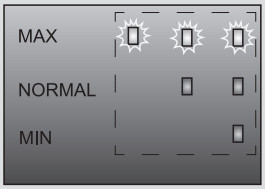
Mode indication (LED colour change):

Operation - green

Setup - red

Filter replacement - intermittent green/red blinking

Table 2. Control panel ventilation mode display

Mode	Indicator combination	Software version	
		DUO/6M901580B	DUO/6T901580
MIN		Minimum air flow Time: unlimited	
NORMAL		Minimum air flow +80 [m^3/h]	Minimum air flow +80 [m^3/h] Time: 30 minutes
MAX		Maximum air flow Time: unlimited	

2. Setup mode.

To enter the Setup mode press and hold the M Fig. 5) for at least 10 seconds until the Operation/Setup indicator changes from green to red.

While in this mode the main ventilation mode indicators display the minimum air flow rate value which corresponds to Speed 1 of the unit according to Table 3.

To modify the air flow rate use the △ button to increase the parameter or the ▽ button to decrease it. The current air flow rate setting is controlled by means of the six indicators displaying the basic ventilation modes of the unit while the red Operation/Setup light is on.

To exit the Setup mode use one of the two alternative methods: either press the M or the , button once again or wait 60 seconds after the last actuation of either the △ or the ▽. button for the system to exit automatically.

Upon exiting the Operation/Setup indicator will change from red to green.

Table 3.

No.	Indication	Air flow [m³/h]
1		90
2		105
3		120
4		135
5		150
6		165
7		180
8		195
9		210

3. Control panel connection.

The control panel view from the connector side is given on Fig. 6.

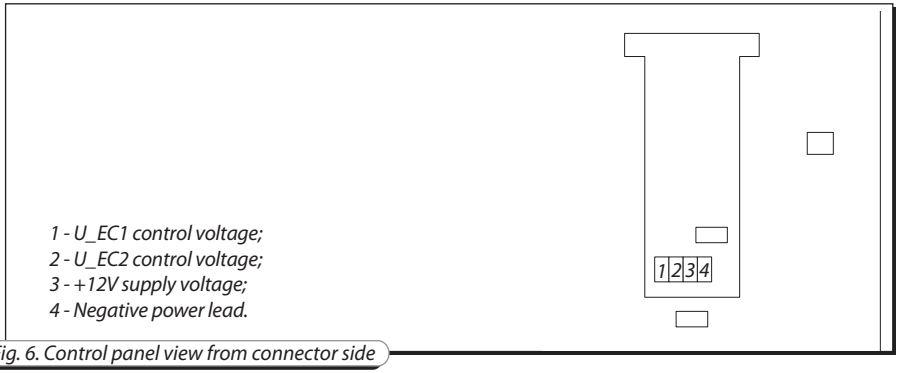


Fig. 6. Control panel view from connector side

The wiring diagram of the unit is shown on Fig. 7

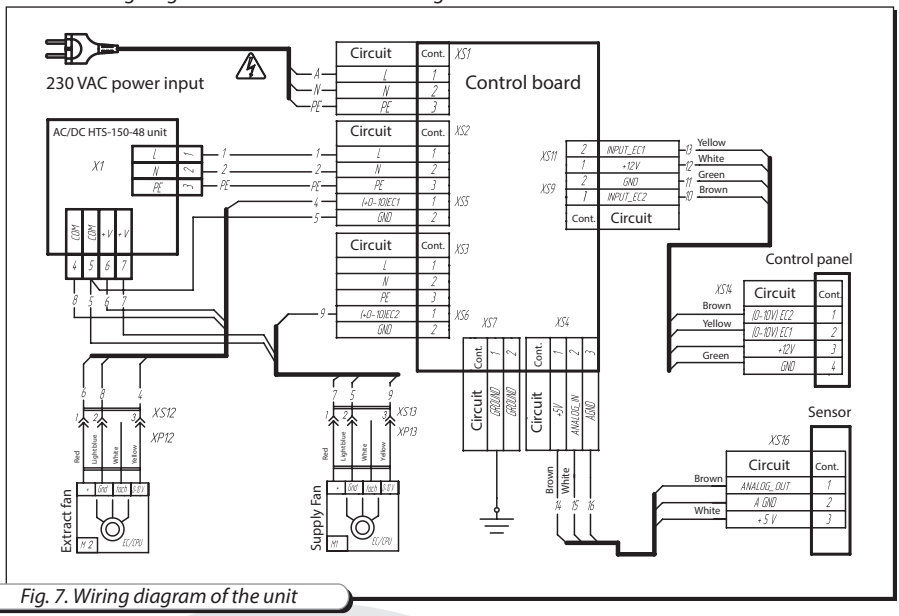


Fig. 7. Wiring diagram of the unit

4. Heat exchanger freeze protection

The air-handling unit is equipped with heat exchanger freeze protection facilities which disable the supply fan at +5 °C in the exhaust air duct downstream of the heat exchanger.

5. Filter replacement indication (for DUO/6M901580B only)

Upon elapsing of the time to filter replacement (3,000 operating hours) the control panel indicator will intermittently blink green and red. This signals the need to shut down the unit and disconnect it from the power mains. Upon completing the above steps clean or replace the filters as necessary (see «Technical maintenance» on page 13).

On completing the filter maintenance reset the hour meter. To reset the hour meter switch on the unit, press the ▲ and the ▼ buttons simultaneously and hold them for at least 10 seconds until the indicator stops blinking and changes to steady green.

TECHNICAL MAINTENANCE

Maintenance operations of the unit are required 3-4 times per year. Maintenance includes regular cleaning and the following operations:

1. Filter maintenance.

Filter Maintenance Frequency:

- DUO/6T901580 - 3-4 times a year;
- DUO/6M901580B - according to the filter service alert generated every 3,000 operating hours (according to the integrated hour meter).

Dirty filters increase air resistance in the system and reduce supply air volume. The filters require cleaning not less than 3-4 times per year. Dirty filters can be restored with a vacuum cleaner or replaced. Contact the unit Seller to purchase new filters.

The steps to replace the filters are as follows (Fig. 8):

1. Release the latches and remove the bottom panel.

2. Turn the latches and remove the condensate drain pan(s).

3. Turn the latches and remove the filters.

2. Fan inspection (once a year).

Even regular technical maintenance of the filters may not prevent dust accumulation on fan part surfaces resulting in overall unit performance drop and less fresh air supplied to the premises.

Clean the fans with a cloth or a soft brush. Do not use water, aggressive solvents, sharp objects etc. as they may damage the impeller.

The steps to replace the filters are as follows (Fig. 8):

1. Release the latches and remove the bottom panel.

2. Turn the latches and remove the condensate drain pan(s).

3. Turn the latches and remove the heat exchangers.

3. Condensate drainage check (once a year).

The condensate drainage (the drain line) may get clogged with the hard particles contained in the extract air. Check the drain line functionality by filling the unit drain pan with water and clean the siphon and the drain line if necessary.

4. Fresh air supply check (twice a year).

The supply grille may get clogged with leaves or other objects resulting in the unit performance drop and less fresh air supplied to the premises. Check the supply grille twice a year and clean it if necessary.

5. Ductwork system check (every 5 years)

Even if you follow all the listed maintenance guidelines, some dust can accumulate inside the air ducts and reduce the unit performance. Duct maintenance means regular cleaning or replacement.

6. Control unit maintenance (if necessary).

The control unit maintenance must be performed by an expert qualified for unassisted operations with electrical installations up to 1,000 V after reading and understanding the user's manual. Disconnect the unit from the power mains prior to the control unit maintenance.

The control unit maintenance steps are as follows (Fig. 9):

1. Undo the eight self-tapping screws securing the control unit cover.
2. Remove the control unit cover.

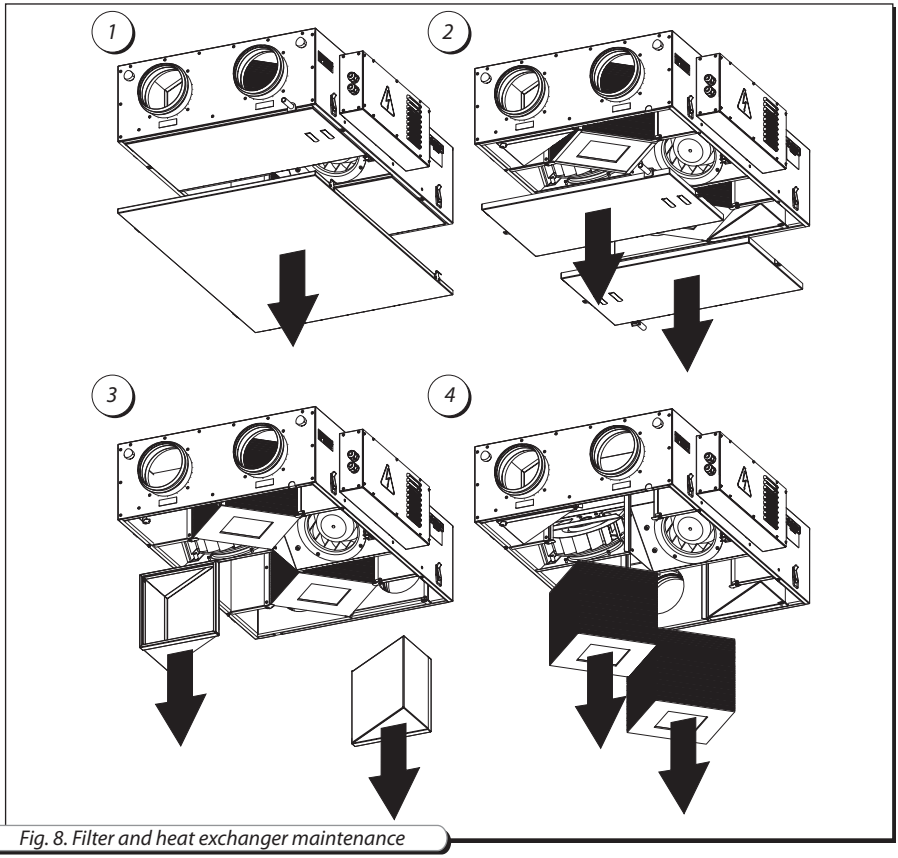


Fig. 8. Filter and heat exchanger maintenance

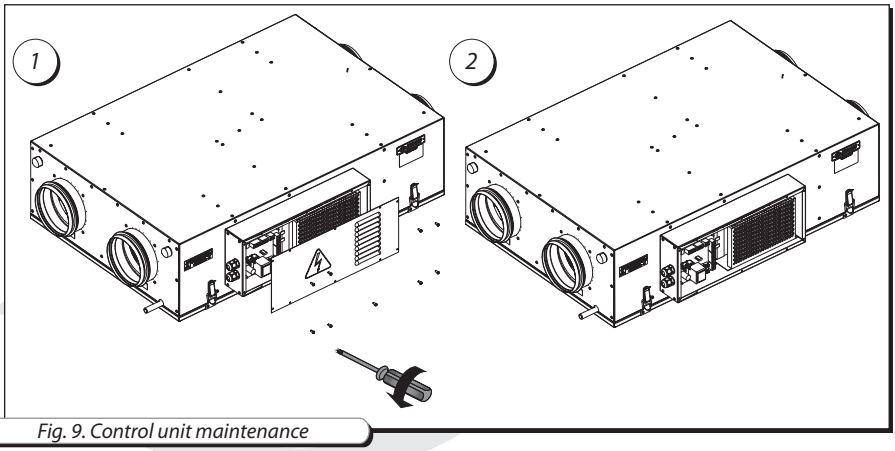


Fig. 9. Control unit maintenance

FAULT HANDLING

Possible malfunctions and their elimination

Problem	Possible reasons	Fault handling
Fan(s) do(es) not start	No power supply.	Make sure that the unit is properly connected to the power mains and make any corrections, if necessary.
Supply air too cold	Exhaust filter clogging.	Clean or replace the extract filter.
	Heat exchanger icing.	Check the heat exchanger for ice. If the heat exchanger has iced wait till the ice melts before re-activating the unit.
Low air flow	Contaminated filters, fans or heat exchanger.	Clean or replace the filters; clean the fans and the heat exchanger.
	Ventilation system contaminated or damaged.	Check the diffusers and louvres for free opening, check the air exhaust hood and the supply grille - clean if necessary. Make sure that the air ducts are not soiled and damaged.
Noise, vibration	Contaminated fan impellers.	Clean the fan impellers.
	Fan mounting screws loose.	Check the mounting screws for any looseness.
Water leakage	Drain line clogged, damaged or improperly arranged.	If necessary, clean the drain line. Check the drain line slope angle and the hydraulic back-pressure valve. Make sure that the drain line has thermal insulation to prevent freezing.

STORAGE AND TRANSPORTATION RULES

The unit must be stored in the original packing in a dry ventilated area at temperatures from +10 °C to +40 °C and maximum relative humidity of 80% (at 20 °C).

The air in the storage space must not contain any vapours or admixtures which may lead to corrosion or compromise the insulation and seals.

Use hoist machinery for handling and transportation to prevent possible mechanical damages of the unit. Fulfil the requirements for transportation of the specified cargo type.

Use any vehicle types for the unit transportation provided that it is protected against mechanical or weather damage.

Avoid any mechanical shocks and strokes during handling operations.

MANUFACTURER'S WARRANTY

The manufacturer hereby warrants normal operation (service life) of the unit over the period of 24 months from the retail sale date provided observance of the transportation, storage, installation and operation regulations.

Should any malfunctions occur in the course of the unit operation through the Manufacturer's fault during the guaranteed period of operation the user is entitled to elimination of faults by the manufacturer by means of warranty repair at the factory carried out free of charge.

The warranty repair shall include work specific to elimination of faults in the unit operation to ensure its intended use by the user within the guaranteed period of operation. The faults are eliminated by means of replacement or repair of the unit components or a specific part of such unit component.

The warranty repair does not include:

- Routine technical maintenance;
- Unit installation/removal;
- Unit setup.

To benefit from warranty repair the user must submit the unit, the User's Manual with the sale date stamp and the payment document certifying the purchase.

The unit model must comply with the one stated in the user's manual.

Contact the Seller for warranty service.

The manufacturer's warranty does not apply to the following cases:

- User's failure to submit the unit with the entire delivery package as stated in the user's manual or with missing component parts previously dismounted by the user;
- Mismatch of the unit model and make with the respective details stated on the unit packaging and in the user's manual;
- User's failure to ensure timely technical maintenance of the unit;
- External damage to the casing (excluding external modifications to the unit as required for installation) and internal components caused by the user;
- Alteration of the unit design or engineering changes to the product;
- Replacement and use of the such unit assemblies, parts and components not approved by the manufacturer;
- Unit misuse;
- User's violation of the unit storage regulations;
- User's violation of the unit control regulations;
- Unit connection to the power mains with a voltage different from the one stated in the user's manual;
- Unit failure due to voltage surges in the power mains;
- Discretionary repair of the unit by the user;

- Unit repair by any persons without the manufacturer's authorization;
- Expiration of the unit warranty period;
- User's violation of the unit transportation regulations;
- User's violation of the unit storage regulations;
- Wrongful acts against the unit committed by a third party;
- Unit failure due to circumstances of insuperable force (fire, flood, earthquake, war, hostilities of any kind, or blockade);
- Missing seals if provided by the user's manual;
- Failure to submit the User's Manual with the unit sale date stamp;
- Missing payment document certifying the unit purchase.

FOLLOWING THE REGULATIONS STIPULATED HEREIN WILL ENSURE A LONG AND TROUBLE-FREE OPERATION OF THE UNIT.

USERS' CLAIMS SHALL BE REVIEWED ONLY UPON PRESENTATION OF THE UNIT, THE PAYMENT DOCUMENT AND THE USER'S MANUAL WITH THE SALE DATE STAMP.

ACCEPTANCE CERTIFICATE

Product Type	**Heat (Energy/Heat and Energy) Recovery Air-Handling Unit**
Model	**VU_____2 250 P EC**
Serial Number	
Manufacturing Date	
is compliant with the technical specifications and is hereby declared ready for service. We hereby declare that the product complies with the essential protection requirements of Electromagnetic Council Directive 2004/108/EC, 89/336/EEC and Low Voltage Directive 2006/95/EC, 73/23/EEC and CE-marking Directive 93/68/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. This certificate is issued following test carried out on samples of the product referred to above.	
Quality Inspector's Stamp	

SELLER INFORMATION

Shop name	
Address	
Phone number	
E-mail	
Sales date	

Seller's seal

This is to certify delivery of the complete unit with the user's manual. The warranty terms are acknowledged and accepted.	
Customer's signature	

CONNECTION CERTIFICATE

The VU _____ 2 250 P EC heat (energy/heat and energy) recovery air-handling unit has been installed and connected to the power mains pursuant to the requirements stated in the present user's manual.		
Company name		
Address		
Phone number		
Installation technician's full name		
Installation date:	**Signature:**	

Installation technician's company seal

This is to certify that the works specific to the unit installation has been performed in accordance with all the applicable provisions of local and national construction, electrical and technical codes and standards. The unit operates normally as intended by the manufacturer.
Signature:

WARRANTY CARD

Product type	**Heat (energy/heat and energy) recovery air-handling unit**
Model	**VU_____2 250 P EC**
Serial number	
Manufacturing date	
Sales date	
Warranty period	
Sales company	

Seller's seal